

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

GUERIN, Michel
THALES
Intellectual Property
31-33, Avenue Aristide Briand
F-94117 Arcueil Cedex
FRANCE

[rubber stamp]

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Applicant's or agent's file reference 62975		IMPORTANT NOTIFICATION	
International application No. PCT/EP 03/51053	International filing date (day/month/year) 18.12.2003	Priority date (day/month/year) 20.12.2002	
Applicant THALES et al.			

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The Applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purpose of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purpose of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0, Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer:

Püschel, S

Tel. +49 89 2399-5812



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or Agent's file reference	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/51053	International filing date (day/month/year) 18.12.2003	Priority date (day/month/year) 20.12.2002
International Patent Classification (IPC) or national classification and IPC G01C19/56		
Applicant THALES et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets including this title page.
☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Instruction 607 of Administrative Instructions of the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement according to Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 30.04.2004	Date of completion of this report 10.09.2004
Name and mailing address of the IPEA  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0, Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer: Springer, O Telephone No. +49 89 2399-2619 

I. Basis of the report

1. This report has been drawn up on the basis of the following elements *(the replacement sheets received by the receiving office in response to an invitation according to Article 14 are considered in the present report as "originally filed" and are not annexed to the report as they contain no amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-8 as originally filed

Claims, No.:

1-17 as originally filed

Drawings, sheets:

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/51053

5. ☐ This report has been written disregarding (some of) the amendments, which were considered as going beyond the description of the invention, as filed, as is indicated below (Rule 70.2(c)):

(All replacement sheets comprising amendments of this nature should be indicated in point 1 and attached to this report).

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	1-17
	No:	Claims	
Inventive Step	Yes:	Claims	1-17
	No:	Claims	
Industrial Applicability	Yes:	Claims	1-17
	No:	Claims	

2. Citations and explanations

see separate sheet

In the matter of point V

Reasoned statement under Article 35(2) as regards novelty, inventive step and industrial applicability; citations and explanations in support of this statement

1. Technical field:

Vibrating gyroscope.

2. Prior art:

Reference is made to the following documents:

D1: WO-A-98/15799: Hahn-Schickard-Gesellschaft; April 16, 1998;

D2: US-A-5 992 233: University of California; November 30, 1999;

D3: US-A-5 747 690; Samsung Electronics Co. Ltd.; May 5, 1998;

D4: MOCHIDA Y ET AL: "A micromachined vibrating rate gyroscope with independent beams for the drive and detection modes" MICRO ELECTRO MECHANICAL SYSTEMS 1999. MEMS '99. TWELFTH IEEE INTERNATIONAL CONFERENCE ON ORLANDO, FL, USA 17-21 JAN. 1999, PISCATAWAY, NJ, USA, IEEE, US, January 17, 1999, pages 618-623, XP/10321778 ISBN: 0-7803-5194-0.

3. Independent Claims: Claim 1 (device).

4. Novelty - Article 33(2) PCT

Document D1, which is regarded as the closest prior art, describes (see the description and the figures of D1, for example on page 9, last paragraph to p. 27, paragraph 1 and fig. 1A, 1B, 2, 3, 4A, 5) a gyroscope comprising at least one mass (p. 18, paragraph 2 to p. 19, paragraph 2 and fig. 3: Primärschwinger [*primary oscillator*] 306a, 306b, Sekundärschwinger [*secondary oscillator*] 314a, 314b and p. 23, last paragraph to p. 27, paragraph 1 and fig. 5: Primärschwinger [*primary oscillator*] 506, Sekundärschwinger [*secondary oscillator*] 514) capable of vibrating along an x axis at a resonant excitation frequency F_x and capable of vibrating along a y axis perpendicular to the x axis, at a resonant detection frequency F_y , under the

effect of a Coriolis force generated by a rotation about a z axis perpendicular to the x and y axes (cf. page 18, last paragraph to page 19, paragraph 2; fig. 3 and p. 24, paragraph 3 to p. 26, paragraph 1; fig. 5). A feedback control loop for controlling the resonant frequency F_y and a signal generator for generating a signal for disturbing the vibration of the mass along y are connected to the masses so that F_y is equal or virtually equal to F_x throughout the duration of use of the gyroscope (cf. p. 12, paragraph 4: "Durch Rückkoppelneiner Wechselspannung ... kann die Eigenfrequenz der Sekundärschwingung erhöht werden" [*Through feedback of an oscillating voltage..... it is possible to increase the natural frequency of the Secondary oscillator*] ; p. 19, paragraph 2; p. 22, paragraph 2 to p. 23, paragraph 1, and p. 27, paragraph 1).

The present application differs from the device known from document D1 in that the gyroscope is characterized in that the feedback control loop comprises means for modifying the resonant detection frequency F_y , means for detecting the variation induced by the disturbing signal on the vibration of the mass along y, an error signal representative of the difference between F_x and F_y and means for controlling the F_y -modifying means. For this reason, the subject matter of claim 1 is considered as novel.

5. Inventive step - Article 33(3) PCT

Thus, the problem to be solved is how to produce a vibrating gyroscope that allows the initial adjustment of making the mechanical resonant frequencies F_x and F_y coincide be able to be maintained in the long term and under all environmental conditions. Such a feedback control loop, as proposed in claim 1, is neither known nor suggested in the cited prior art. For this reason, the subject matter of claim 1 is considered as inventive.

Claims 2 to 17 depend on claim 1 and therefore, as such, also satisfy the conditions required by the PCT as regards novelty and inventive step.

6. Industrial applicability - Article 33(4) PCT

Claims 1 to 17 are capable of industrial application in the field of vibrating gyroscopes.

7. Clarity - Article 6 PCT

The application does not fulfil the conditions stipulated in Article 6 PCT, claims 5, 9, 11 and 14 not being clear for the following reasons:

7.1 Dependent claims 5 and 9:

It is not clear what "*a predetermined bandwidth*" is. Is this bandwidth a predetermined **frequency** bandwidth?

7.2 Dependent claims 11 and 14:

Claims 11 and 14 refer to claims 1 to 3, but the frequency F_0 is not introduced into claims 1 to 3.